

NATIONAL WATER-QUALITY ASSESSMENT (NAWQA) PROGRAM

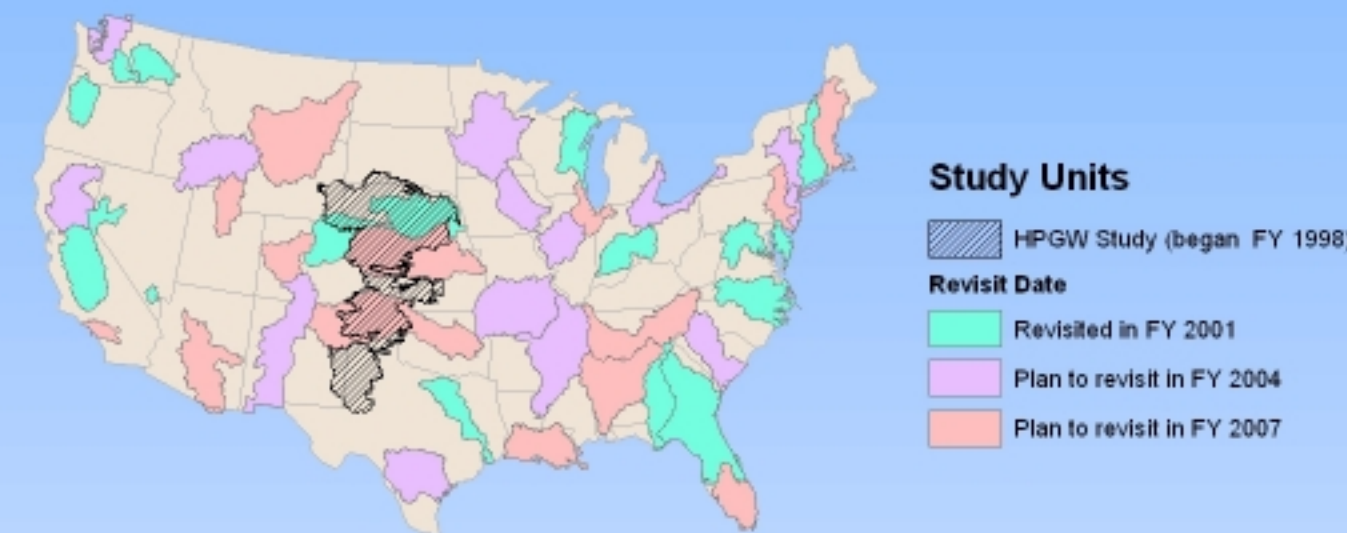
The NAWQA Program was designed to assess the water-quality conditions in the Nation's largest river basins and aquifers.

NAWQA Program Goals

STATUS -- Describe the quality of the Nation's water resources in a nationally consistent manner

TRENDS -- Assess long-term trends and changes in water quality

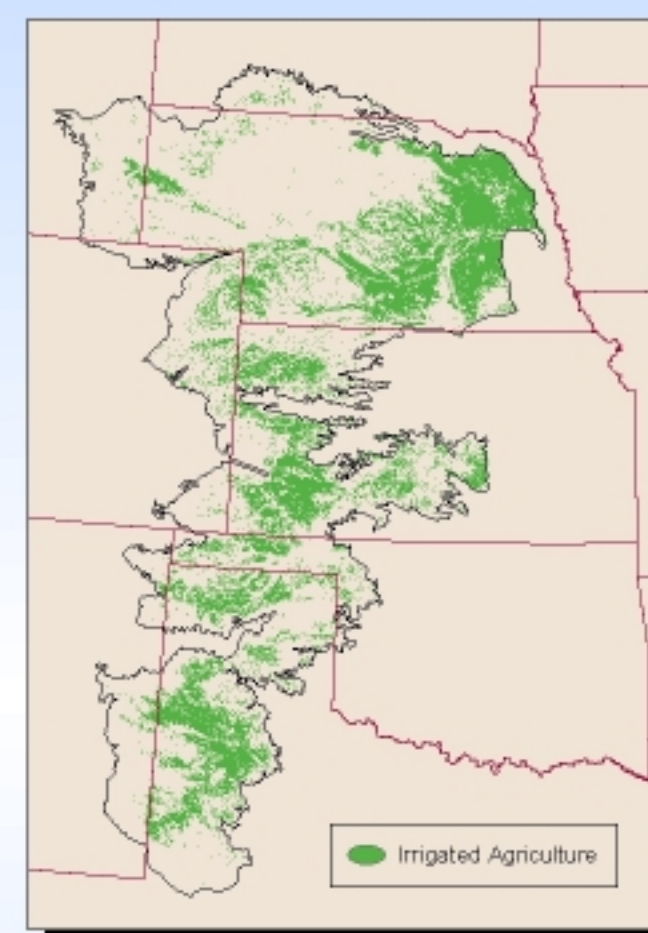
UNDERSTANDING -- Identify, describe, and explain factors that govern water quality



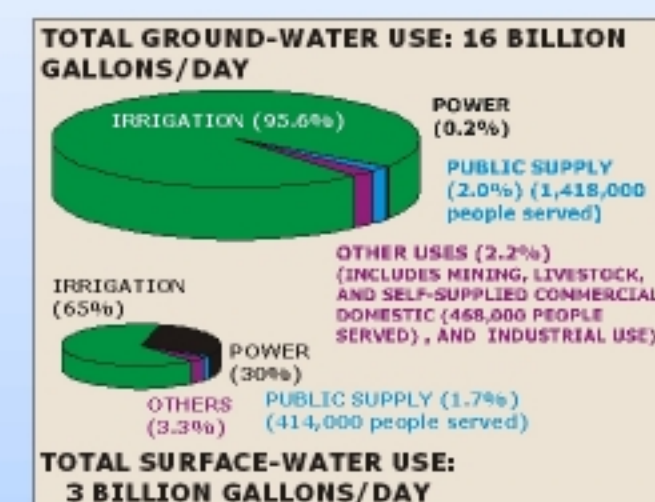
PHYSICAL AND CULTURAL CHARACTERISTICS OF THE HIGH PLAINS STUDY AREA



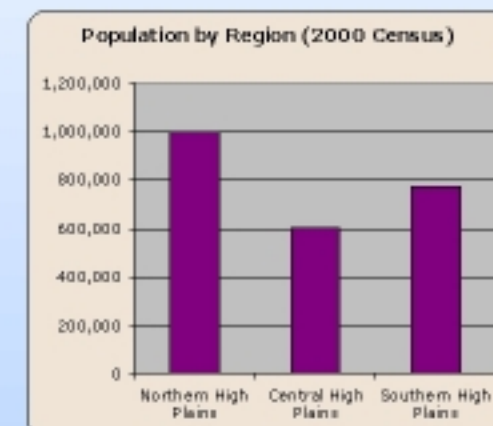
Location of the study area.



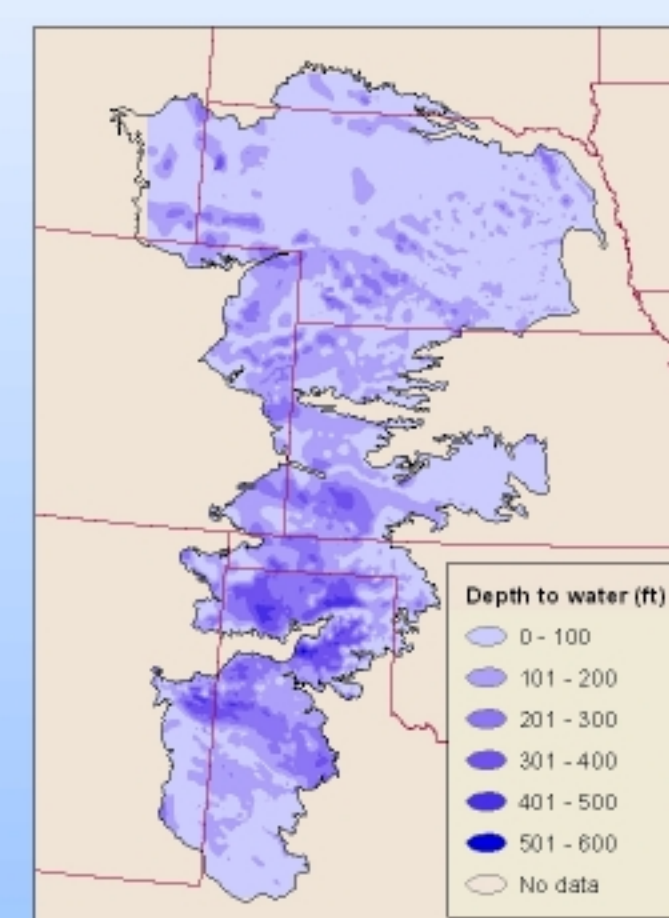
Location of irrigated lands (1992) over the High Plains aquifer.



During 1995, about 83% of the total water used was pumped from the aquifer and 17% was from surface-water withdrawal.



About 38% of the people live in the 10 largest cities, mainly along the fringes of the study area, and the rest of the population is rural.



High Plains Regional Ground-Water Study (HPGW) includes...

- ▶ 174,000 square miles in parts of eight states
- ▶ About 27% of the irrigated land in the U.S.
- ▶ About 30% of the irrigation water use in the U.S.
- ▶ A total population of about 2.4 million (2000 Census)
- ▶ An average depth to water of 100 feet

STUDY DESIGN

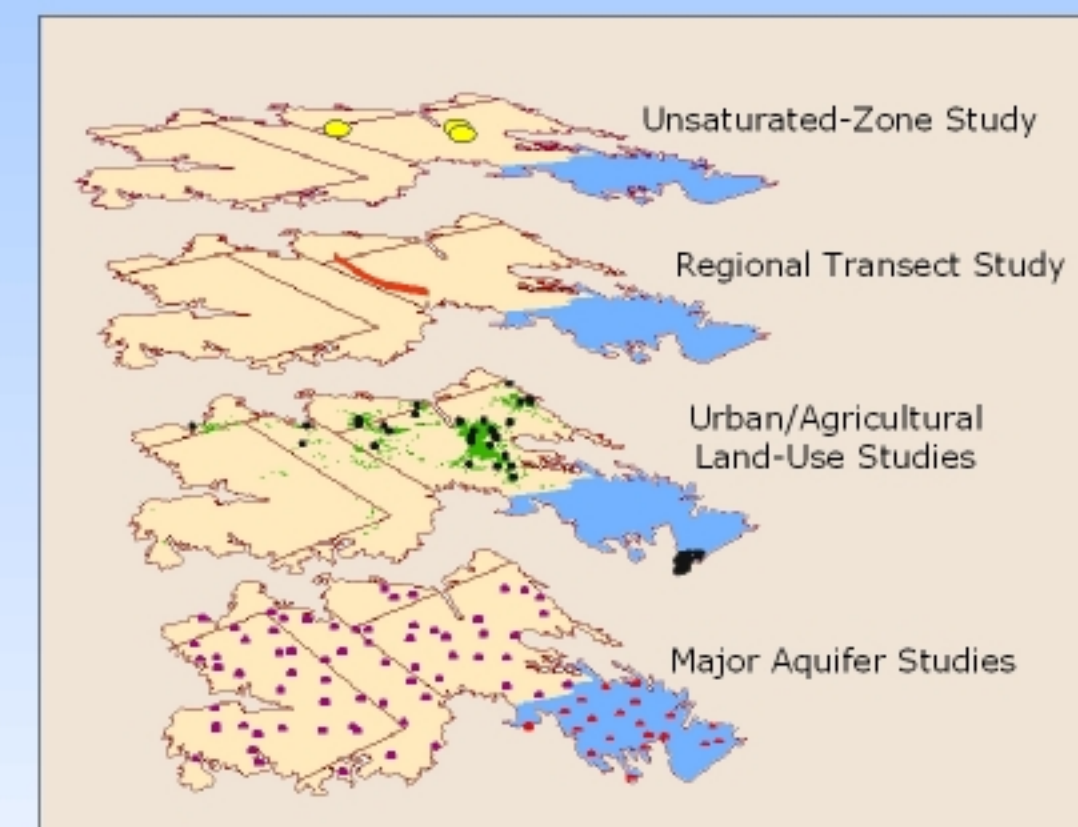
Multiple-scale nested studies are integral to water-quality assessment. Ground-water studies needed for this assessment include:

Unsaturated-Zone Studies--Measure recharge rates and chemical fluxes to the water table through relatively thick unsaturated sediments under irrigated and non-irrigated conditions.

Regional Transect Studies--Measurements of vertical changes in water chemistry and ground-water age contributes to the understanding of natural and human factors that control the evolution of ground-water quality.

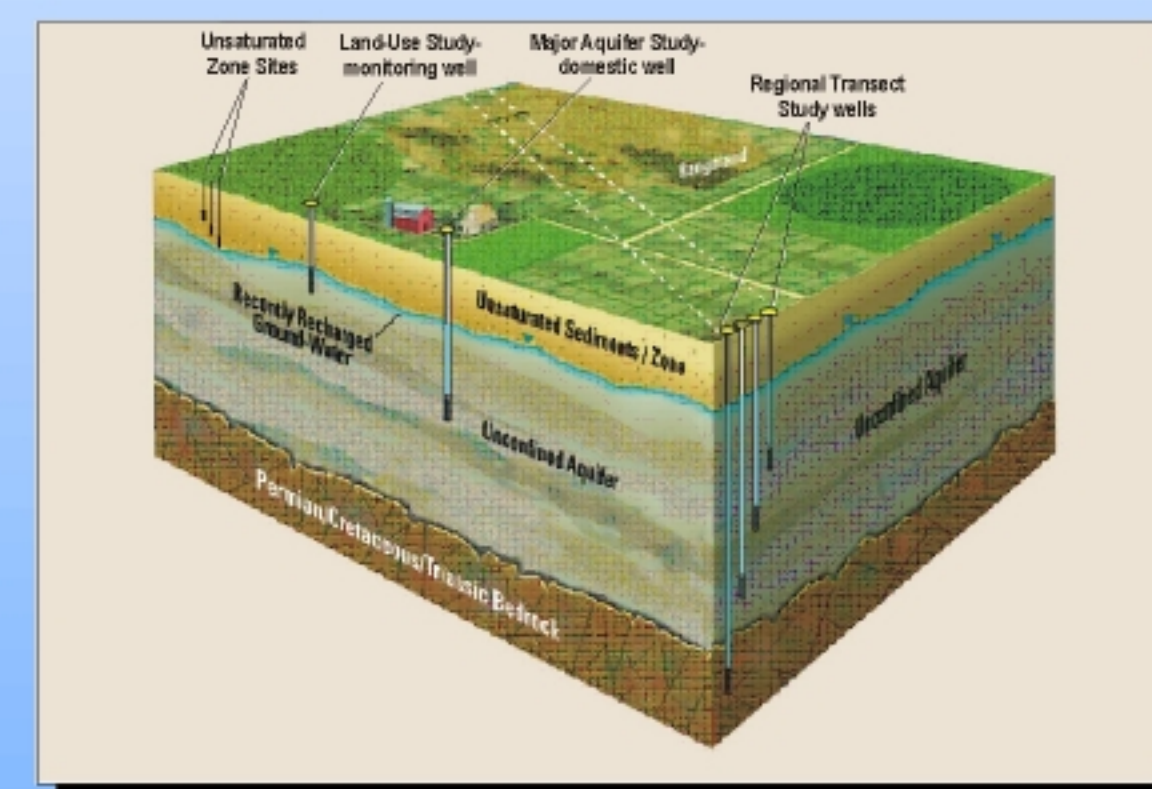
Urban/Agricultural Land-Use Studies--Assessment of recently recharged ground water beneath urban and agricultural land-use areas.

Major Aquifer Studies--Broad-scale assessment of ground-water quality.



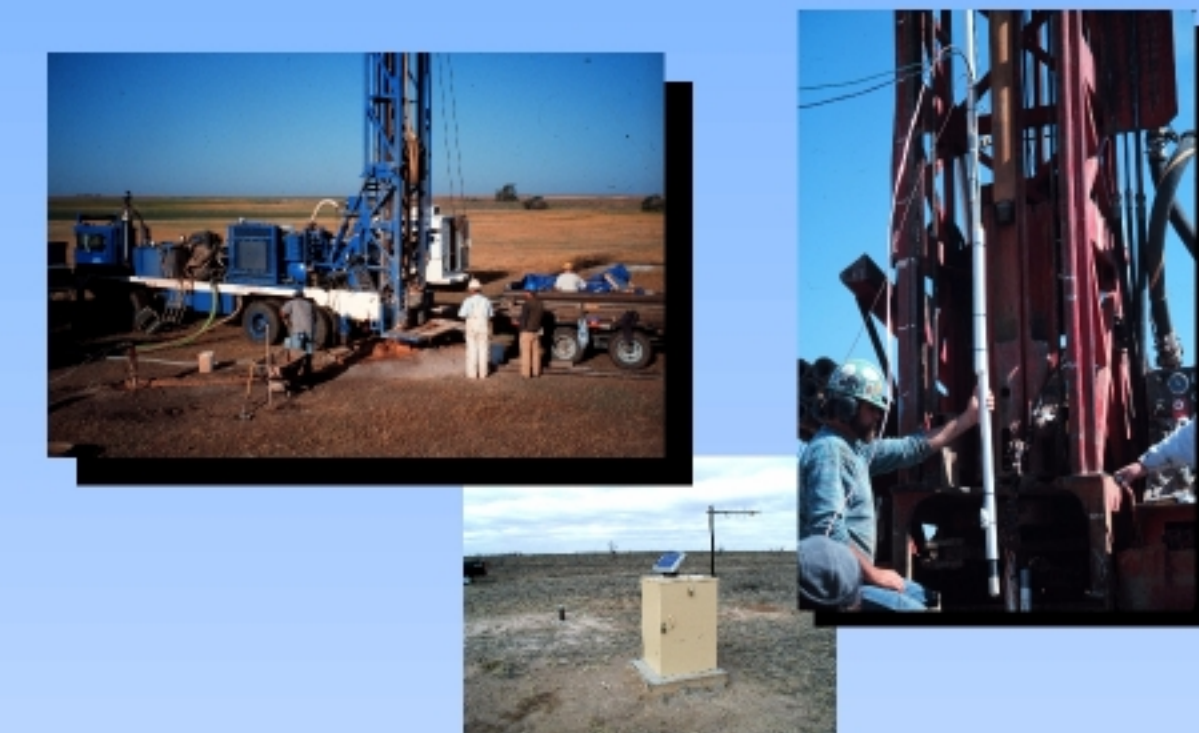
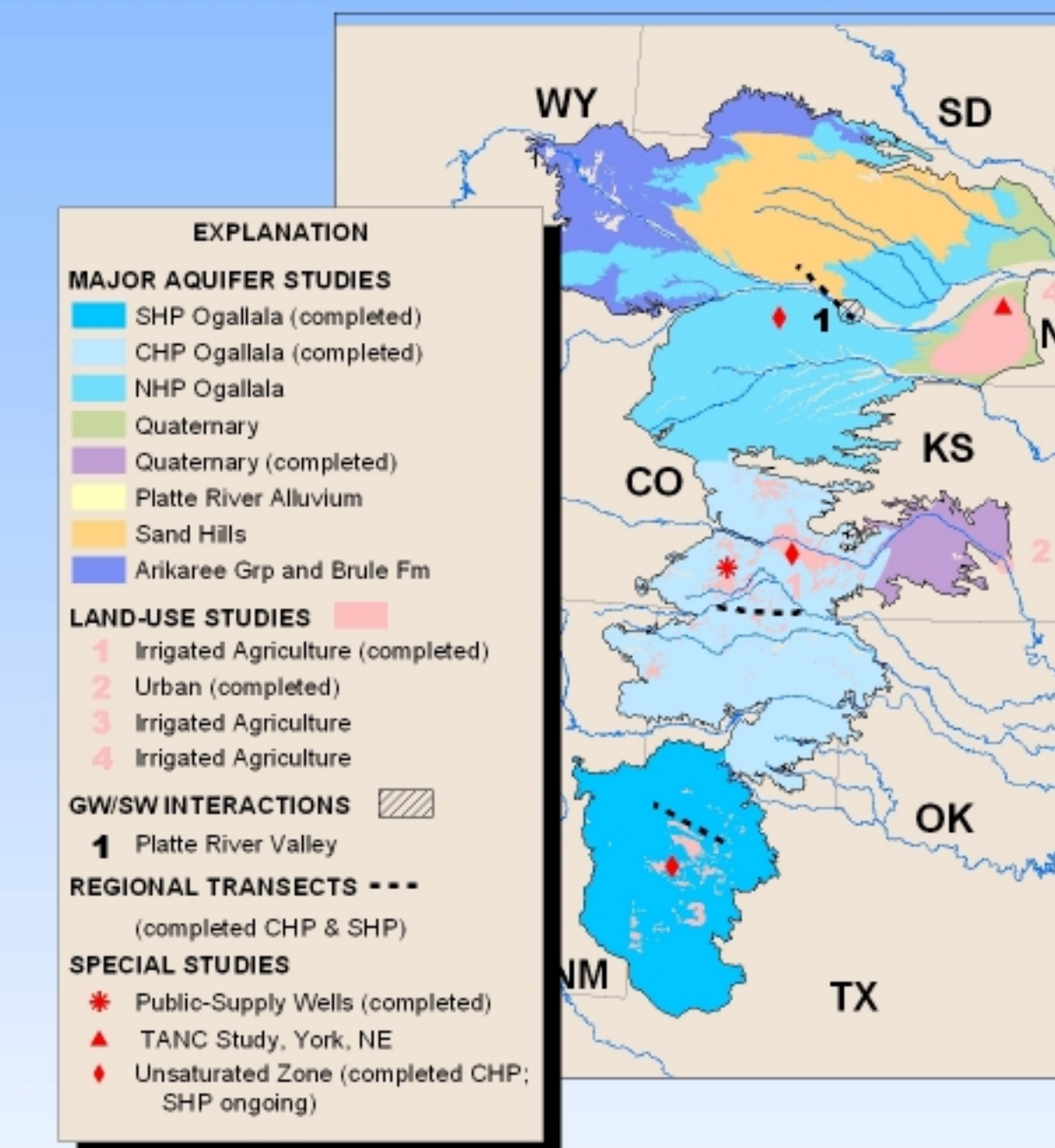
The holistic approach includes aerial and vertical nesting of studies.

Multiple-scale nested studies within the central High Plains region provide an aerial assessment of water quality as well as....



...a vertical assessment of water quality. Nesting studies vertically makes it possible to explain observed variability by developing an understanding of the physical and chemical processes that govern water quality.

HPGW STUDY ACTIVITIES (1999-2004)



HPGW well and instrument installation



HPGW sampling activities

SUMMARY

A holistic approach using multiple-scale nested studies can produce a comprehensive assessment of water quality resulting in a better understanding of:

- ▶ Current water-quality conditions
- ▶ Ground-water vulnerability
- ▶ Occurrence and tracking of contaminant sources over time
- ▶ Natural and anthropogenic factors that govern water quality



The High Plains at a glance